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Application Number	09/966,970
Filing Date	September 28, 2001
First Named Inventor	Jeffery D. Harper
Art Unit	2676
Examiner Name	Kee M. Yung
Attorney Docket Number	

ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input checked="" type="checkbox"/> Fee Attached  <input checked="" type="checkbox"/> Amendment/Reply <input checked="" type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s)  <input checked="" type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement  <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/ Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers  <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation <input type="checkbox"/> Change of Correspondence Address  <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund  <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance Communication to TC <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
Remarks		

## SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT

Firm Name	Hand Held Products, Inc.		
Signature			
Printed name	Gerald P. Joyce III		
Date	August 4, 2005	Reg. No.	37,648

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Date	8/4/2005

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Appl. No. 09/966,970

REPLY UNDER 37 C.F.R. 1.116  
Expedited Procedure  
Technology Center - 2676**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

Appl. No. : 09/966,970 Confirmation No. 5811  
Applicant : Jeffery D. Harper  
Filed : September 28, 2001  
TC/A.U. : 2676  
Examiner : Kee M. Tung

Docket No. :  
Cust. No. :

**TITLE :** METHOD AND APPARATUS FOR SIMULTANEOUS IMAGE CAPTURE AND IMAGE DISPLAY IN AN IMAGING DEVICE

Commissioner for Patents  
P.O. Box 1450  
Alexandria VA 22313-1450

**AMENDMENT**

Sir:

In response to the Office Action mailed April 5, 2005, having a period for response set to expire on July 5, 2005, Applicants request a one-month extension in which to respond (extending the response date to August 5, 2005, entry of the following amendments and consideration of the following remarks/arguments.

The Amendments to the claims, if any, are reflected in the listings of claims that begin on page 2 of this paper.

The Amendments to the Drawings, if any, begin on page 13 of this paper and include both an annotated sheet showing changes and an attached replacement sheet in an Appendix following the signature page of this paper.

The Remarks/Argument begin on page 14 of this paper.

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REPLY UNDER 37 C.F.R. 1.116  
Expedited Procedure  
Technology Center - 2676Amendments to the Claims:

The text of all pending claims, (including withdrawn claims) is set forth below. Cancelled and not entered claims are indicated with claim number and status only. The claims as listed below show added text with underlining and deleted text with strikethrough. The status of each claim is indicated with one of (original), (currently amended), (cancelled), (withdrawn), (new), (previously presented), or (not entered).

Listing of Claims:

1. (currently amended) An imaging device for simultaneous image capture and image display updating, the device comprising:
  - | an imager for capturing image data upon aiming the imager at an image;
  - | a central processing unit (CPU) that is in communication with the imager and issues commands to capture image data;
  - | a direct memory access module in communication with the imager and the CPU that executes the commands to capture image data;
  - | ~~a memory module in communication with the CPU and the DMA module, the memory module including a first image capture buffer, accessible to the CPU, that temporarily stores first-in-time captured image data prior to displaying first-in-time image data; and~~
  - | a second image capture buffer, accessible to the CPU, that temporarily stores second-in-time captured image data prior to displaying second-in-time image data; and
  - | an image enhancer for enhancing image data stored in the first and second image capture buffers prior to display.
2. (original) The image device of claim 1, further comprising a display that displays to a user first-in-time image data followed by the display of second-in-time image data.
3. (original) The image device of claim 1, further comprising a field programmable gate array device that implements the direct memory access (DMA) module.

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4. (original) The image device of claim 1, further comprising a means for enhancing image data stored in the first and second image capture buffers.

5. (original) The image capture device of claim 1, further comprising a means for reformatting image data stored in the first and second image capture buffers.

6. (previously presented) The image device of claim 1, wherein the memory module further includes an image display buffer that temporarily stores captured image data that has been enhanced prior to display.

7. (previously presented) A method for simultaneous image capture and image display in an imaging device, the method comprising the steps of:

    capturing first-in-time image data to a first image capture buffer that is in communication with an imager;

    enhancing the first-in-time image data after capture to the first image capture buffer;

    capturing second-in-time image data to a second image capture buffer that is in communication with an imager; and

    displaying the first-in-time image data on a display while the image device captures the second-in-time image data to the second image capture buffer.

8. (original) The method of claim 7, further comprising the steps of:

    capturing third-in-time image data to the first buffer once the first-in-time image data is displayed; and

    displaying the second-in-time image data on a display while the image device captures the third-in-time image data to the first buffer.

9. (original) The method of claim 7, wherein capturing first-in-time image data to a first image capture buffer, further comprises the step of:

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issuing, at a CPU, a capture command to a DMA module to capture first-in-time image data to the first image capture buffer;

queueing, at the DMA module, the capture command until the DMA module receives an end-of-frame signal;

executing, at the DMA module, the capture command to capture first-in-time image data to the first image capture buffer; and

transferring the first-in-time image data from the imager to the first image capture buffer.

10. (original) The method of claim 7, wherein capturing second-in-time image data to a second image capture buffer, further comprises the step of:

issuing, at a CPU, a capture command to a DMA module to capture second-in-time image data to the second image capture buffer;

queueing, at the DMA module, the capture command until the DMA module receives an end-of-frame signal;

executing, at the DMA module, the capture command to capture second-in-time image data to the second image capture buffer; and

transferring the second-in-time image data from the image to the second image capture buffer.

11. (canceled)

12. (original) The method of claim 7, further comprising the step of re-formatting the first-in-time image data after capture to the first image capture buffer and before displaying the first-in-time image data on the display.

13. (canceled)

14. (original) The method of claim 8, wherein the step of capturing third-in-time image data to the first buffer once the first-in-time image data is displayed, further comprises the steps of:

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issuing, at a CPU, a capture command to a DMA module to capture third-in-time image data to the second image capture buffer in response to an EOF signal;

queuing, at the DMA module, the capture command until the DMA module receives an EOF signal;

executing, at the DMA module, the capture command to capture third-in-time image data to the first image capture buffer; and

transferring the third-in-time image data from the imager to the first image capture buffer.

15. (previously presented) A method for simultaneous image capture and image display in an imaging device, the method comprising the steps of:

issuing a first command to capture first-in-time image data to a first image capture buffer;

issuing a second command to capture second-in-time image data to a second image capture buffer;

executing the first capture command;

signaling end-of-frame (EOF) upon the completion of capturing the first-in-time image data to the first image capture buffer;

enhancing the first-in-time image data that is captured to the first image capture buffer;

issuing a third command to capture third-in-time image data to the first image capture buffer;

executing the second capture command; and

displaying the enhanced first-in-time image data to an imaging device display while the imager executes the second command to capture second-in-time image data to the second image capture buffer.

16. (previously presented) The method of claim 15, further comprising the steps of:

signaling end-of-frame (EOF) upon the completion of capturing the second-in-time image data to the second image capture buffer;

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enhancing the second-in-time image data that is captured to the first image capture buffer;

issuing a fourth command to capture fourth-in-time image data to the second image capture buffer;

executing the third capture command; and

displaying the enhanced second-in-time image data to the imaging device display while the imager executes the third command to capture third-in-time image data to the first image capture buffer.

17. (canceled)

18. (previously presented) The method of claim 15, further comprising the step of storing the enhanced first-in-time image data in an image display buffer prior to displaying the first-in-time image data on the image device display.

19. (previously presented) The method of claim 15, wherein the step of enhancing the second-in-time image data that is stored in the second image capture buffer further comprises the step of reformatting the first-in-time image data that is stored in the first image capture buffer prior to displaying the first-in-time image data on the image device display.

20. (previously presented) The method of claim 19, further comprising the step of storing the reformatted first-in-time image data in an image display buffer prior to displaying the enhanced first-in-time image data on the image device display.

21. (canceled)

22. (canceled)

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23. (original) The method of claim 22, further comprising the step of storing the enhanced second-in-time image data in an image display buffer prior to displaying the second-in-time image data on the image device display.

24. (previously presented) The method of claim 16, further comprising the step of reformatting the second-in-time image data that is stored in the second image capture buffer prior to displaying the enhanced second-in-time image data on the image device display.

25. (original) The method of claim 24, further comprising the step of storing the reformatted second-in-time image data in an image display buffer prior to displaying the second-in-time image data on the image device display.

26. (canceled)

27. (previously presented) The method of claim 24, further comprising the step of storing the enhanced and reformatted first-in-time and second-in-time image data in an image display buffer prior to displaying the first-in-time and second-in-time image data on the image device display.

28. (previously presented) An imaging device for substantially simultaneous image capture and image display updating, the device comprising:

an imager for capturing image data upon aiming the imager at an image;  
a central processing unit (CPU) that is in communication with the imager and issues commands to capture image data; and

a memory module in communication with the CPU, the memory module including a first image capture buffer, accessible to the CPU, that temporarily stores first-in-time captured image data prior to displaying first-in-time image data and a second image capture buffer, accessible to the CPU, that temporarily stores second-in-time captured image data prior to displaying second-in-time image data.

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29. (previously presented) The image device of Claim 28, further comprising a means for enhancing image data stored in the first and second image capture buffers.

30. (previously presented) The image device of Claim 28, wherein the memory module further includes an image display buffer that temporarily stores captured image data that has been reformatted prior to display.

31. (previously presented) The image device of Claim 28, further comprising a direct memory access (DMA) module in communication with the imager, the CPU and the memory module, wherein the DMA module executes the commands to capture image data.

32. (previously presented) The image device of Claim 28, further comprising an image reformatter for re-formatting image data stored in the first and second image capture buffers prior to display.

33. (currently amended) A portable data acquisition and display device, the device comprising:

an imaging barcode reader for capturing image data and decoding bar code symbols;

a processor in communication with the barcode reader;

a memory unit, in communication with the processor, for storing image data captured by the imaging barcode reader, wherein the memory unit includes a plurality of image capture buffers that are configured to store image data;

a display device, in communication with the processor; and

| a memory-controller element, in communication with the memory unit and the processor, for controlling image data in the plurality of image capture buffers such that first image data is stored in a first image capture buffer, second image data is stored in a second image capture buffer while the first image data is being

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distributed from the first image capture buffer to the display, and third image data is stored in one of the plurality of image capture buffers while the second image data is being distributed from the second image capture buffer to the display.

34. (currently amended) The device of Claim 33, wherein the memory-control elementcontroller for controlling image data in the plurality of image capture buffers such that third image data is stored in one of the plurality of image capture buffers while the second image data is being distributed from the second image capture buffer to the display further defines the one of the plurality of image capture buffers as the first image capture buffer.

35. (currently amended) The device of Claim 33, wherein the memory-control elementcontroller for controlling image data in the plurality of image capture buffers such that third image data is stored in one of the plurality of image capture buffers while the second image data is being distributed from the second image capture buffer to the display further defines the one of the plurality of image capture buffers as a third image capture buffer.

36. (currently amended) The device of Claim 34, wherein the memory-control elementcontroller for controlling image data in the plurality of image capture buffers further comprises controlling image data in the image capture buffers such that fourth image data is stored in one of the plurality of buffers while the third image data is being distributed from the first image capture buffer to the display.

37. (currently amended) The device of Claim 35, wherein the memory-control elementcontroller for controlling image data in the plurality of image capture buffers further comprises controlling image data in the image capture buffers such that fourth image data is stored in one of a plurality of buffers while the third image data is being distributed from the third image capture buffer to the display.

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38. (currently amended) The device of Claim 33, wherein the memory-control elementcontroller is further defined as controlling image data in the plurality of image capture buffers such that first image data is stored in a first image capture buffer, second image data is stored in a second image capture buffer substantially simultaneous with the first image data being distributed from the first image capture buffer to the display, and third image data is stored in one of the plurality of image capture buffers substantially simultaneous with the second image data being distributed from the second image capture buffer to the display.
39. (currently amended) The device of Claim 33, wherein the memory-control elementcontroller includes an image processing module for processing the image data.
40. (previously presented) The device of Claim 39, wherein the image processing module provides for enhancement of the image data.
41. (previously presented) The device of Claim 39, wherein the image processing module provides for reformatting of the image data.
42. (previously presented) The device of Claim 33, wherein the portable data acquisition and display device is further defined as a handheld device.
43. (previously presented) The device of Claim 33, wherein the imaging barcode reader for capturing image data and decoding bar code symbols further defines the bar code symbols as chosen from the group consisting of one-dimensional bar code symbols and two dimensional bar code symbols.
44. (currently amended) The device of Claim 33, wherein the memory-control elementcontroller is in communication with the imaging barcode reader.

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45. (currently amended) The device of Claim 33, wherein the ~~memory control element~~controller is in communication with the display device.

46. (previously presented) A method for image capture and display in an imaging barcode reader device including a display, the method comprising the steps of:

capturing a first image with an imaging barcode reader;

storing the first image in a first image capture buffer of a plurality of image capture buffers;

capturing a second image with the imaging barcode reader;

storing the second image in a second image capture buffer of the plurality of image capture buffers;

distributing the first image to the display while the second image is being stored in the second image capture buffer;

capturing a third image with the imaging barcode reader;

storing the third image in one of the plurality of image capture buffers; and

distributing the second image to the display while the third image is being stored in one of the plurality of image capture buffers.

47. (previously presented) The method of Claim 46, wherein the step of distributing the first image to the display while the second image is being stored in the second image capture buffer is further defined as distributing the first image to the display substantially simultaneous with the second image being stored in the second image capture buffer.

48. (previously presented) The method of Claim 46, wherein the step of storing the third image in one of the plurality of image capture buffers after the first image has been distributed to the display is further defined as storing the third image in the first image capture buffer after the first image has been distributed to the display.

49. (previously presented) The method of Claim 46, wherein the step of storing the third image in one of the plurality of image capture buffers after the first image has

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been distributed to the display is further defined as storing the third image in a third image capture buffer.

50. (previously presented) The method of Claim 46, wherein the step distributing the second image to the display while the third image is being stored in one of the plurality of image capture buffers is further defined as distributing the second image to the display substantially simultaneous with the third image being stored in one of the plurality of image capture buffers.

51. (previously presented) The method of Claim 46, further comprising the steps of enhancing the first image data stored in the first image capture buffer prior to distributing the first image data to the display and enhancing the second image data stored in the second image capture buffer prior to distributing the second image data to the display.

52. (currently amended) The method of Claim 46, further comprising the step of reformatting the first image data stored in the first image capture buffer prior to distributing the first image data to the display and reformatting the second image data stored in the second image capture buffer prior to distributing the second image data to the display.

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**ADMENDMENTS TO THE DRAWINGS**

The amendments to the drawings requested herein comprise the addition of a "Prior Art" label to FIGs. 2 and 3. An appendix following this paper includes replacement sheets and annotated sheets highlighting the requested changes.

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Technology Center - 2676**REMARKS/ARGUMENTS**

Revised FIGs. 2 and 3 are presented herewith in response to the Examiner's request that they be labeled "PRIOR ART."

The drawings have been objected to for failing to show every feature of the invention specified in the claims. Similarly, claims 33-45 and 46-52 have been rejected under 35 USC 112(1). Amendments have been requested under 37 CFR 1.116 to render these rejections moot. The recited controller corresponds to the FPGA 240 which incorporates the DMA 230 (see at least FIG. 4). As such amendments should have been expected, entry thereof is requested in accordance with MPEP 714.12 and 714.13.

Claims 1-3, 5-10, 12, 14-16, 18-20, 23-25 and 27-52 stand rejected under 35 USC 103 as being unpatentable over the admitted prior art and Rao et al. In light of the following remarks, the rejection is respectfully traversed.

According to M.P.E.P. §2143, to set forth a Prima Facie case of obviousness, the Examiner must satisfy three basic criteria:

- 1) there must be some suggestion or motivation to modify the reference or to combine reference teachings;
- 2) there must be a reasonable expectation of success; and
- 3) the prior art references (or references when combined) must teach or suggest all of the claim limitations.

Applicants respectfully submit that the examiner has failed to supply an adequate motivation for the cited combination. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. In making his rejection, the examiner appears to be using hindsight and simply recites the problem identified and solved by the present invention. More to the point, a statement that the claimed invention would have been "well within the ordinary skill of the art at the

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time the claimed invention was made" because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a *prima facie* case of obviousness without some objective reason to combine the teachings of the references. See MPEP2143.01.

Applicant's admitted prior art consists of a block diagram of hardware and software modules of a known portable imaging device. Examples of portable imaging devices include: bar code readers, optical character readers, digital cameras and the like. Looking at FIG. 3, the use model of the admitted prior art is to capture the image to a buffer, enhance and reformat the image within the buffer and subsequent painting of the image on the display. The capturing of the image comprises reading the image from an imager, such as a CMOS or CCD sensor. Timing is dependant on the capture cycle of the imaging device and the time required for enhancing and reformatting the image in the buffer.

Rao et al. is directed toward a typical processing system in a PC system. In particular, Rao et al. is directed toward relieving the CPU of the burden of transferring data from system memory to a frame buffer in a display controller. As set forth at page 3, lines 17 through 25, prior to Rao et al., multiple CPU cycles were required for each word of data to be transferred. Other problems addressed by Rao et al., revolve around efficient use of memory space. The solution presented by Rao et al. is to dedicate normal system memory as the frame buffer, e.g. by co-locating the system memory and the frame buffer on a single integrated circuit. There is no image capture taught or suggested.

Applicants respectfully submit that no motivation exists to combine the teachings of the prior art with the teachings of Rao et al. For example, there is nothing in the admitted prior art that indicates the use of additional buffers to solve the identified problem. Perhaps more to the point, Rao et al., supplies no teaching or suggestions (much less motivation) applicable to imaging devices or image capture in general. More specifically, Rao et al. is silent on processing a concurrent image capture process.

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If the Applicant had to guess, the reason that motivation is not found is that the two references provide two completely different functionalities in two completely different systems (general purpose computers versus imaging devices). In any event, the examiner has failed to set forth a *prima facie* case of obviousness and withdrawal of the rejection based on the combination of the admitted prior art and Rao et al. is respectfully requested.

Applicants also respectfully submit that the combination of Applicant's admitted prior art and Rao et al. is improper as Rao et al. is non-analogous to Applicant's admitted prior art and the problem at hand.

One of the problems address by the present invention is that all frames captured by the imager could not be displayed on the portable device as the pre-processing and painting routines interfere with the capture process. In the example discussed in the specification, at page 3 lines 13 et seq., the 10 to 20 millisecond delay imparted by the pre-processing and painting processes meant that only every other frame that could be captured from the imager.

There is nothing in the solutions presented in Rao et al. which would indicate that they are reasonably relevant to the problems addressed by the present invention. It should be noted that the teachings of Rao et al. are not necessarily in the same field of endeavor as the claimed subject matter merely because it relates to the use of memories for display.

Applicant also notes that the defendant claims, such as claim 6, contain elements not shown or suggest by the totality of the references.

In accordance with the foregoing it is respectfully submitted that all outstanding objections and rejections have been overcome and/or rendered moot. Thus, there being no further outstanding objections or rejections, the application is submitted as being in condition for allowance, such action being earnestly solicited.

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If the Examiner has any remaining informalities to be addressed, it is believed that prosecution can be expedited by the Examiner contacting the undersigned attorney for a telephone interview to discuss resolution of such informalities.

If any further fees are required in connection with the filing of this Amendment, please charge same to our Deposit Account No. 50-1078.

Respectfully submitted,  
HANDHELD PRODUCTS, INC.

Date: August 4, 2005By: 

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